

OPERATING SUMMARY

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ESPANOLA

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ESPANOLA  
WATER POLLUTION CONTROL PLANT  
and  
WATER SUPPLY SYSTEM  
operated for  
THE TOWN OF ESPANOLA  
by  
MINISTRY OF THE ENVIRONMENT  
1973 ANNUAL OPERATING SUMMARY

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### WATER POLLUTION CONTROL PLANT

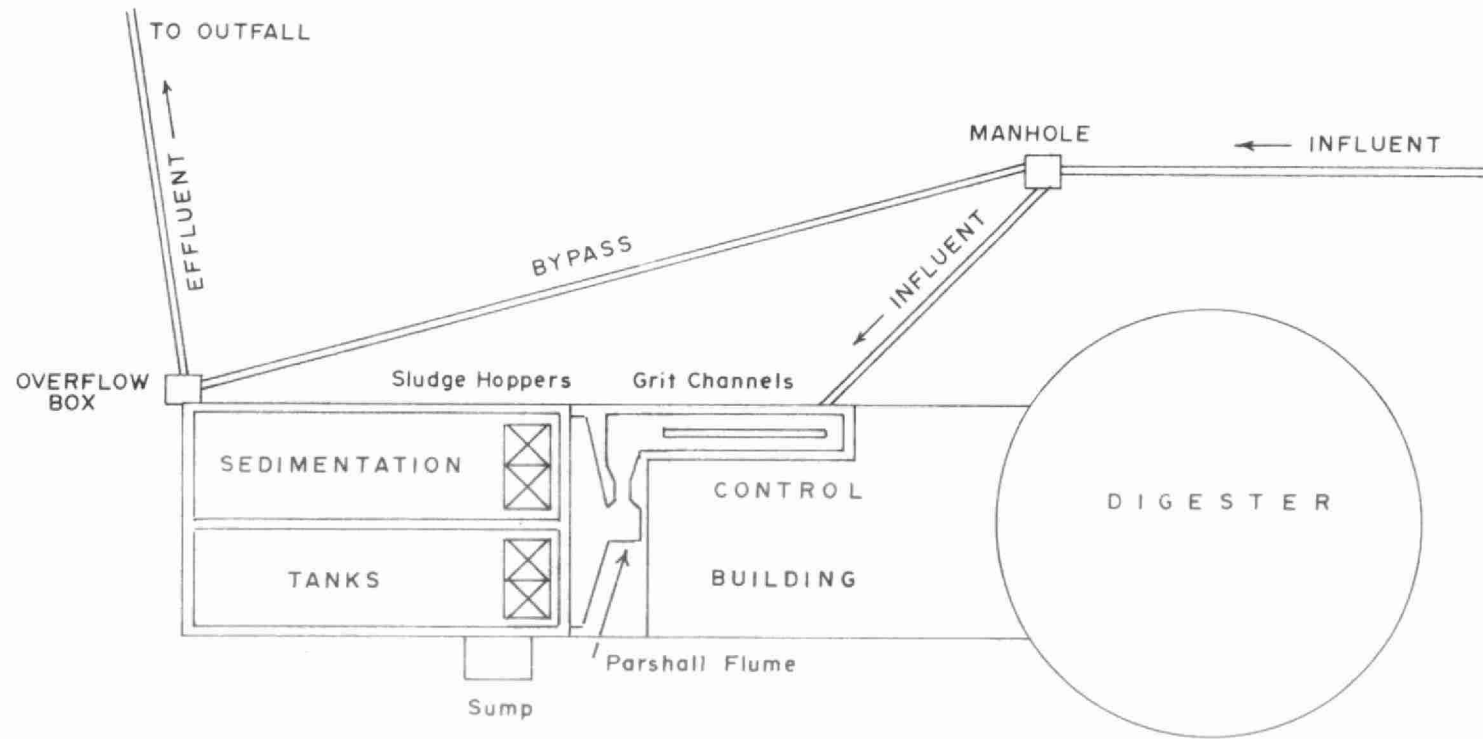
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## **WATER POLLUTION CONTROL PLANT**

ESPANOLA  
WATER POLLUTION CONTROL PLANT



## DESIGN DATA

PROJECT NAME	Espanola Water Pollution Control Plant
PROJECT NO.	2-0074-61 <u>SCREENING</u>
TREATMENT	Primary    2 manually cleaned bar screens
DESIGN FLOW	0.66 mgd <u>GRIT REMOVAL</u>

Two channels - 14'6" x 1.5' x 1.07'  
(liq. depth)  
Flow Velocity - 1.0 fps

PRIMARY SEDIMENTATION

Size: Two 36' x 12' x 10'  
Volume: 8640 ft<sup>3</sup> or 54,000 gal.  
Detention: 1.95 hours  
Loading: Surface 773 gpd/ft<sup>2</sup>

OUTFALL

Spanish River

SLUDGE DISPOSAL

Single stage digestion, fixed roof  
Size: One 35' dia. x 19.4' swd  
Volume: 18,700 ft<sup>3</sup> or 116,000 gal.

# '73 Review

## GENERAL

The project consists of a 0.66 million gallon per day primary treatment plant with one-stage anerobic digestion.

A new chief operator, Mr. L. Desjardins was hired at the beginning of the year to replace Mr. E. Bois who retired.

A 1968 GMC 1/2 ton pickup truck was purchased for use at the sewage and water projects.

Major work performed at the plant during the year included:

- a) Rebuilding of the piston pumps.
- b) Overhauling of the clarifier flights and chains.
- c) Installation of new baffles in one of the clarifiers.

The flowmatcher in the Spruce St. pumping station overheated and failed on a few occasions. A revised vari-drive system will be installed in 1974 which will alleviate the need for the flowmatcher system.

## EXPENDITURES

The total operating cost for the sewerage project for the year was \$22,162 representing an increase of 14% over the previous year.

The average cost per million gallons of sewage treated was \$152 which compares favourably to \$165 in 1972.

The only reserve fund expenditure during the year was \$1,200 for the overhaul of the clarifier flights and chains.

## PLANT FLOW AND CHLORINATION

The flowmeter was inoperable in January, February, and December. The average daily flow for the year was estimated to be 430 thousand gallons.

The average daily design flow of 666 thousand gallons was exceeded only 7 per cent of the time.

The installation of chlorination facilities at the Espanola Water Pollution Control Plant will be undertaken in 1975. Plans and specifications for the works will be prepared in 1974.

#### PLANT EFFICIENCY

The raw sewage BOD and suspended solids concentration averages were 190 mg/l and 160 mg/l respectively which represent a BOD decrease of 16 per cent and a suspended solids decrease of 8 per cent from the previous year.

The final effluent BOD and suspended solids concentration averages were 107 mg/l and 82 mg/l respectively and compare with the figures for the previous year. The BOD removal efficiency was 44 per cent and the suspended solids removal efficiency was 49 per cent.

#### SLUDGE DIGESTION AND DISPOSAL

A total of 772 thousand gallons of raw sludge was pumped to the digester and a total of 3.2 thousand gallons of digested sludge was removed and hauled to a disposal site. A partial digester cleanout was carried out in 1972 and as a result it was not necessary to haul the normal quantity of sludge in 1973.

The average total solids concentration of the raw sludge was 1.2 per cent of which the volatile solids content averaged 77 per cent. The digested sludge total solids averaged 1.7 per cent of which 69 per cent was volatile matter. The solids concentration in the digested sludge hauled from the plant will be increased to a minimum of 3.5% in 1974.

The volatile solids reduction was calculated to be 33.5%. This is below average for a primary treatment plant and the reduction will be improved when the proper digester mixing equipment is installed early in 1975.

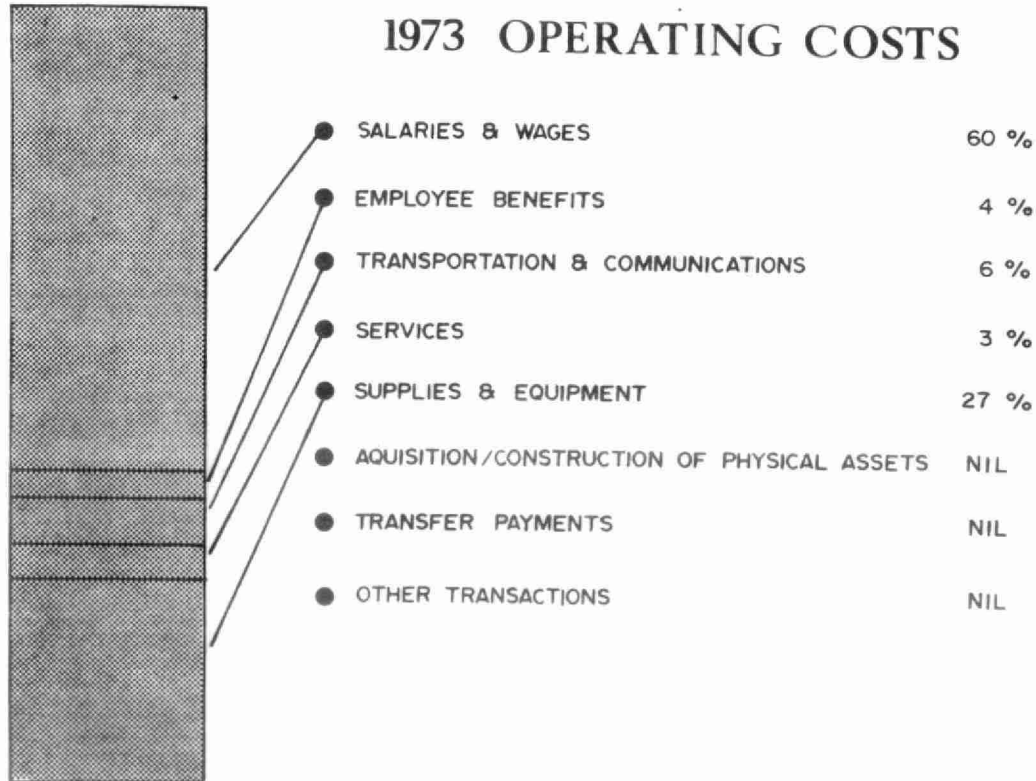
#### CONCLUSIONS

The plant produced an acceptable effluent most of the time during the year.

Chlorination facilities and sludge mixing equipment will be installed early in 1975. The installation of the sludge mixing equipment will greatly improve the digester operation.

# ANNUAL COSTS

## 1973 OPERATING COSTS



## YEARLY OPERATING COSTS

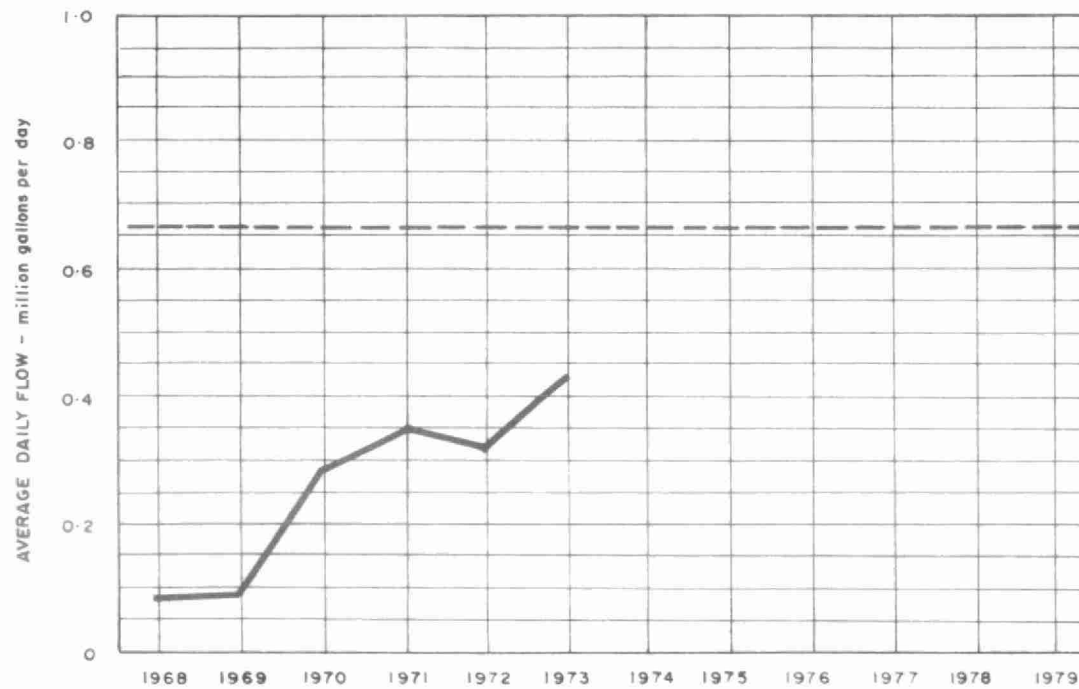
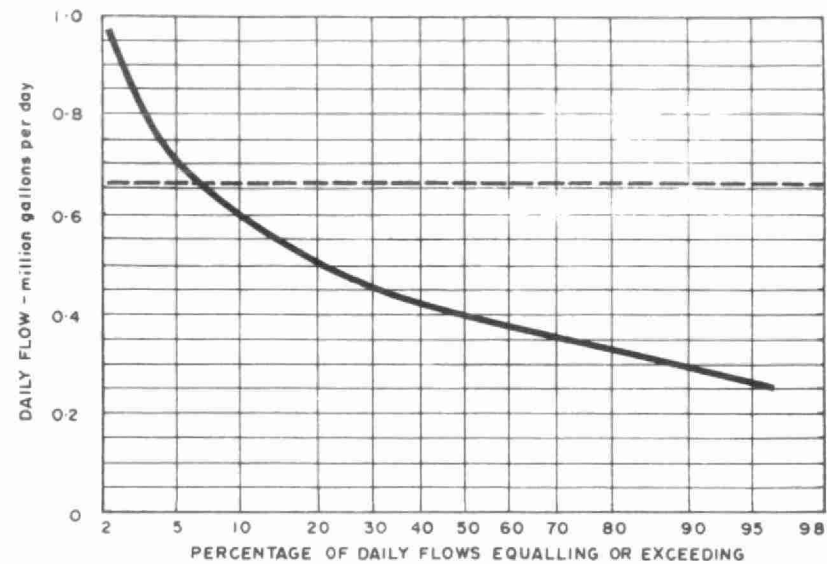
YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS	
			\$/M.G.	¢/lb BOD
1972	117*	\$ 19,388	166	17
1973	146*	22,162	152	20

\* Estimated

## OPERATING EXPENDITURES

SALARIES AND WAGES	<u>\$13,395</u>
EMPLOYEE BENEFITS	<u>915</u>
TRANSPORTATION & COMMUNICATIONS	<u>1,228</u>
SERVICES	<u>624</u>
SUPPLIES AND EQUIPMENT	<u>6,000</u>
ACQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	<u>0</u>
TRANSFER PAYMENTS	<u>0</u>
OTHER TRANSACTIONS	<u>0</u>
TOTAL	<u>\$22,162</u>

# PROCESS DATA FLOWS



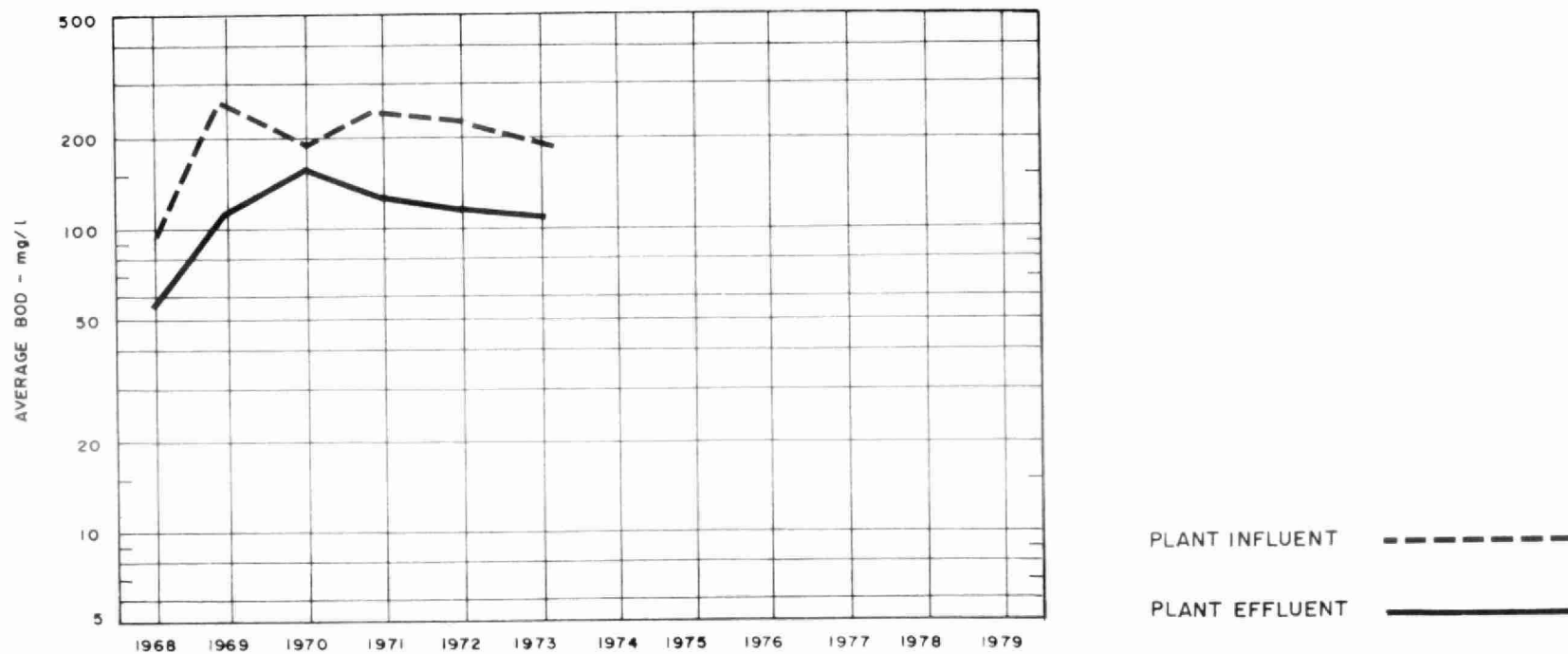
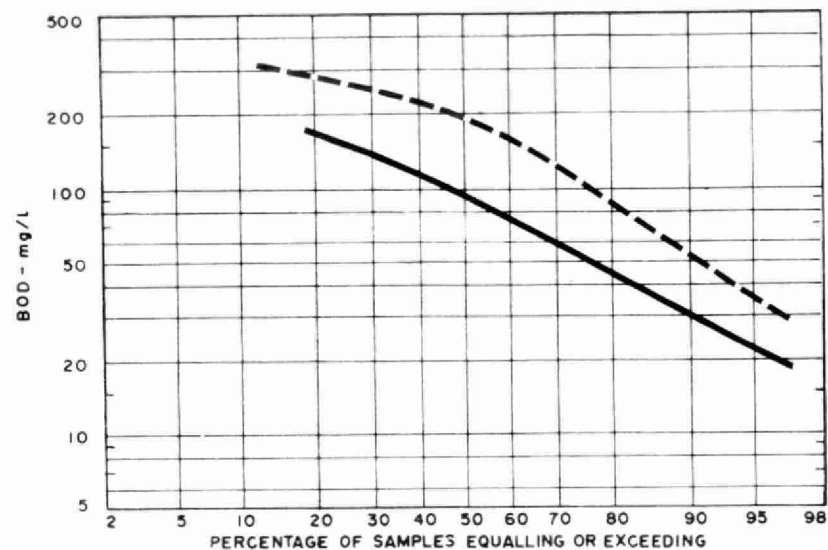
DESIGN CAPACITY - - - - -

## PLANT PERFORMANCE

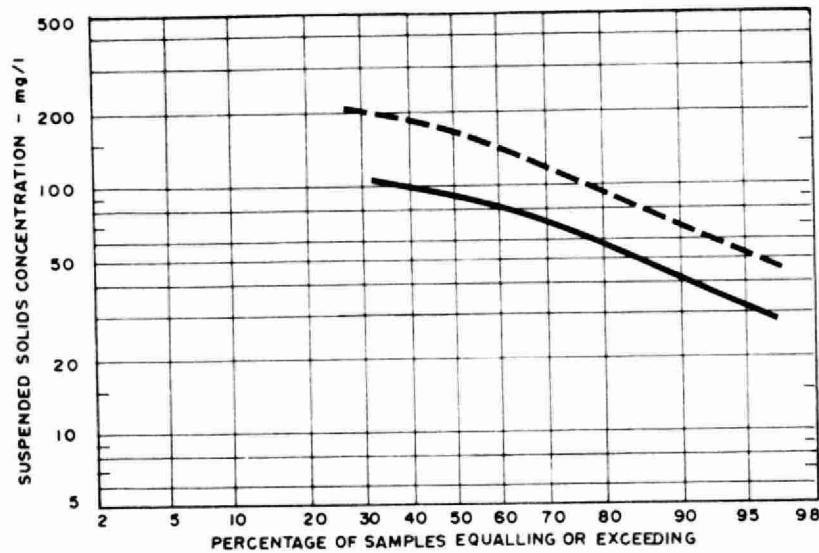
MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT
	million gallons	mil. gal	mgd	mg/l	mg/l	%	10 <sup>3</sup> pounds	mg/l	mg/l	%	10 <sup>3</sup> pounds	mg/l P	mg/l P
JAN				200	180	10		170	120	29		16.0	14.0
FEB				170	100	40		170	100	42		15.0	13.0
MAR	14.9	0.48	1.20	180	160	14	3.7	130	100	19	3.8	7.8	8.9
APR	8.7	0.29	0.38	250	150	38	8.2	170	97	44	6.6	22.0	11.0
MAY	9.9	0.32	0.42	220	140	36	7.9	160	80	50	7.9	10.0	6.9
JUNE	10.9	0.36	0.44	240	120	49	13.0	180	100	45	8.9	8.1	8.3
JULY	13.8	0.45	0.67	100	85	17	2.5	120	80	36	6.2	6.3	7.3
AUG	15.8	0.51	0.80	110	57	47	7.8	110	65	41	7.1	5.6	5.3
SEPT	17.3	0.58	1.4	200	62	69	24.0	160	50	69	19.0	6.9	4.9
OCT	14.9	0.48	0.56	140	80	41	8.1	180	75	58	16.0	6.1	4.9
NOV	12.0	0.40	0.69	180	100	44	9.8	250	83	67	20.0	7.0	5.3
DEC				260	70	73		180	45	75		9.9	4.7
TOTAL	146.0*	-	-	-	-	-		-	-	-		-	-
AVG.		0.43 *	MAXIMUM 1.4	190	107	44	9.4	160	82	49	12.0	10.0	7.8
No. of Samples	-	-	-	23	23	-	-	23	23	-	-	23	23

\* Estimate

# BIOCHEMICAL OXYGEN DEMAND



# SUSPENDED SOLIDS



PLANT INFLUENT

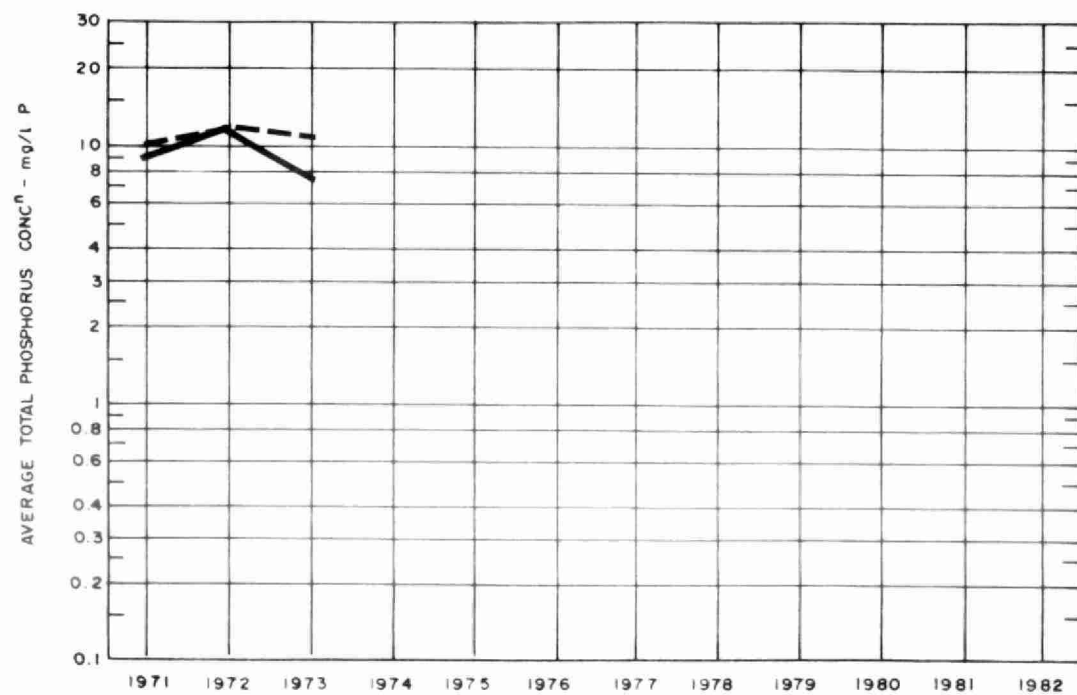
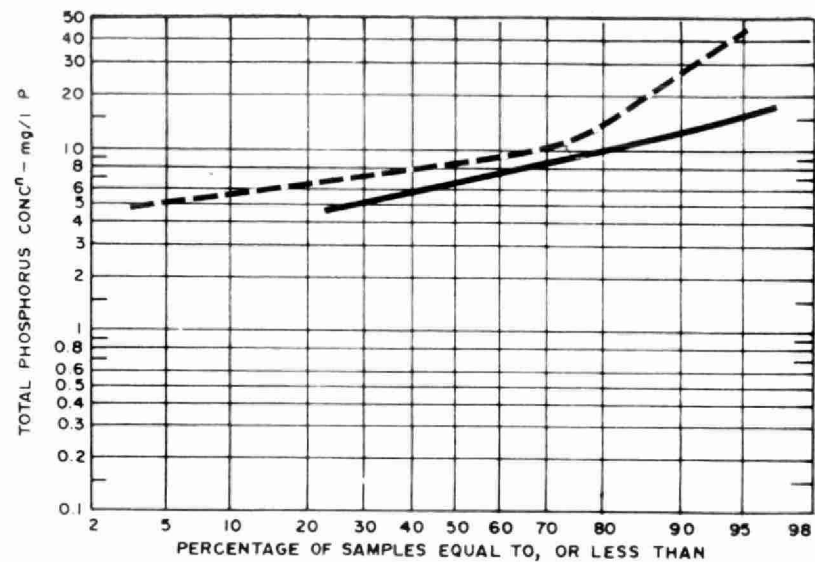
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PLANT EFFLUENT

—————



# PHOSPHORUS



PLANT INFLUENT -----

PLANT EFFLUENT —————

## TREATMENT DATA

	GRIT	CHLORINATION		SLUDGE DIGESTION and DISPOSAL							
MONTH	QUANTITY REMOVED cubic feet	CHLORINE USED 10 <sup>3</sup> pounds	AVERAGE DOSAGE mg/l	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT	SLUDGE HAULED cubic yards
				QUANTITY 10 <sup>3</sup> gallons	TOTAL SOLIDS %	VOLATILE SOLIDS %	QUANTITY REMOVED 10 <sup>3</sup> gallons	TOTAL SOLIDS %	VOLATILE SOLIDS %	TOTAL SOLIDS %	
JAN	45	0		64							
FEB	43	0		58							
MAR	51	0		64							
APR	38	0		61	1.2	84		0.2	80	0.1	
MAY	42	0		65	0.8	81		0.7	70	0.1	
JUNE	30	0		61	1.4	82		3.4	64	0.2	
JULY	30	0		64	0.2	79					
AUG	22	0		64	0.9	67		3.2	64	0.1	
SEPT	15	0		60	0.6	72				0.1	
OCT	22	0		63	1.2	82	3.2	1.5	70	0.1	19
NOV	15	0		62	3.2	62		1.3	65	0.1	
DEC	9	0		86	1.5	85		1.6	70	0.1	
TOTAL	362		—	772	—	—	3.2	—	—	—	19
AVG.	2.5 cubic feet/mil gal	0		64	1.2	77		1.7	69	0.1	

## **WATER SUPPLY SYSTEM**

## DESIGN DATA

PROJECT                      Espanola Water Supply System

PROJECT NO.                      6-0072-61

TREATMENT                      Chlorination and  
Fluoridation

DESIGN FLOW                      1 mgd

### INTAKE

225 ft. of 18" dia. corrugated metal  
pipe

### SCREENS

Two 3'9" x 2'4 3/4"  
3/8" mesh

### WET WELL

7'6" x 22" x 4' min. wl  
Capacity at min. wl 4100 imp. gal.

### PUMPS

Type: 3 Worthington centrifugal  
each 600 US gpm

### DIESEL

(Standby) Continental Red Seal - F226

### CHLORINATOR

Type: Wallace & Tiernan A-831  
Capacity: 50 lb./day

Standby Chlorinator: Wallace & Tiernan  
Capacity: 50 lb./day

### FLUORIDE FEEDER

Type: Wallace & Tiernan Series A-690

### ELEVATED TANK:

Capacity: 200,000 gallons

# '73 Review

## GENERAL

The project consists of a water intake, a 1.6 million gallon per day capacity pumping station at Lake Apsey, a 166 thousand gallon capacity standpipe, and a water transmission line to the town. The pumping station is equipped with three 500 gpm vertical turbine pumps. Treatment consists of chlorination and fluoridation at the pumping station.

The fluoridation equipment operated satisfactorily throughout the year excepting several weeks in August when the automatic timing mechanism was inoperable and the fluoride feed rate had to be adjusted manually.

The standpipe was cleaned out in May and November of the year and the clear well was cleaned out in June.

An instrument for recording water levels in the standpipe was installed in the spring of the year and will provide more data which can be used in solving the low pressure problems which occur during peak flow demands in the summer months.

Abnormal pressure drops were recorded at the Fire Hall only on two occasions during the year, both in July.

The plant flow meter was replaced in the spring of the year with a new meter and a recorder.

## EXPENDITURES

The total operating cost for the water supply project was \$18,502. which represents an increase of 23 per cent over the previous year.

The average cost per thousand gallons of water treated was 9 cents which was the same as the cost in the previous year.

## PROCESS

There were no recorded complaints regarding taste and odour problems in 1973. The taste and odour problems gave rise to a design report in 1972 for the provision of complete water treatment for the municipality.

The total volume of treated water supplied to the community during the year was 207.6 million gallons which represents an average daily consumption of 570 thousand gallons.

The average fluoride concentration in the treated water was 0.8 mg/l based on 111 samples of which 83 per cent were in the acceptable range of 0.8 to 1.2 mg/l. The total amount of sodium silicofluoride required for the year was 3,060 pounds.

The average chlorine dosage for the year was 1.6 mg/l requiring 3,409 pounds of chlorine. The average residual in the treated water was 0.7 mg/l.

## BACTERIOLOGICAL QUALITY

A total of 34 samples of treated water was taken at the plant and all samples were found to be free of coliform organisms. Two out of 248 samples in the distribution system indicated the presence of coliform organisms.

Samples analysed for iron, chlorides and pH were found to be satisfactory. Samples analysed for hardness and alkalinity were found to be below the desirable standards set by the Ministry.

## CONCLUSIONS

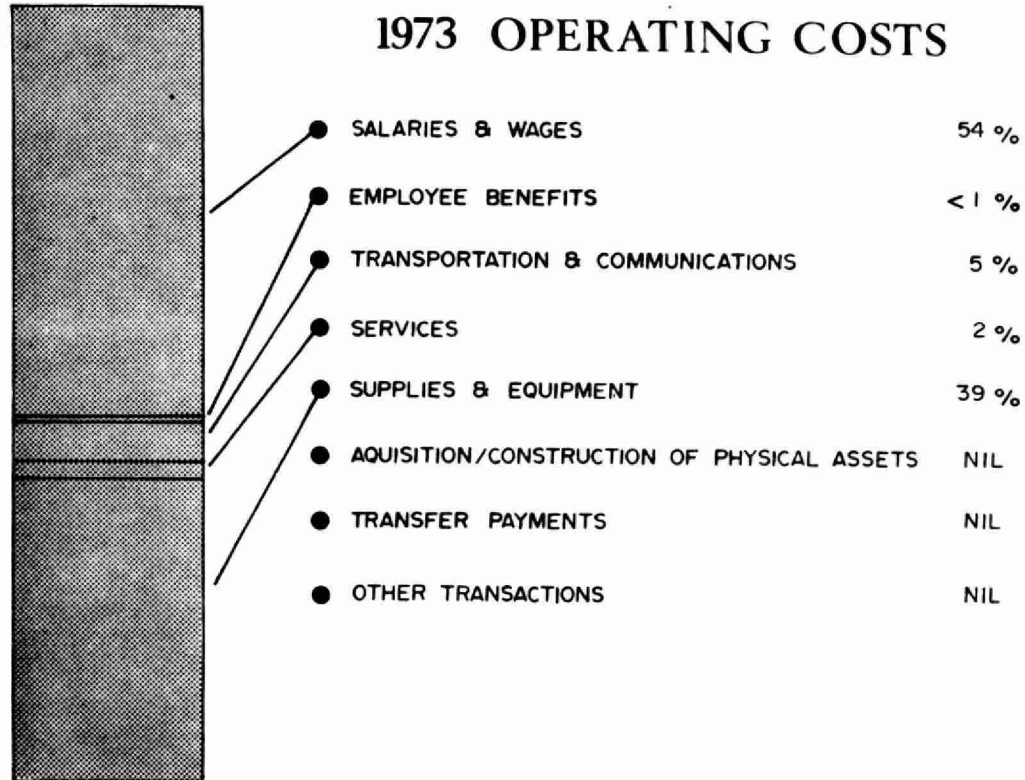
Low pressure problems were experienced only on two occasions during the year; both in the month of July.

There were no recorded complaints regarding taste and odour problems in 1973.

There were no process problems regarding chemical treatment and there were no difficulties in meeting the water demands of the municipality during the year.

# ANNUAL COSTS

## 1973 OPERATING COSTS



## YEARLY OPERATING COSTS

YEAR	WATER TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS
			cents per 1000 gal
1972	175 *	\$15,002	9
1973	208	18,502	9

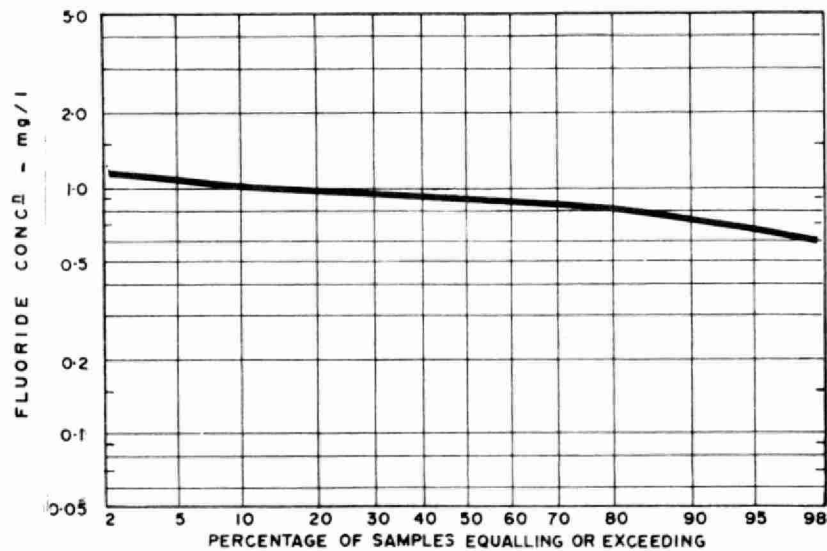
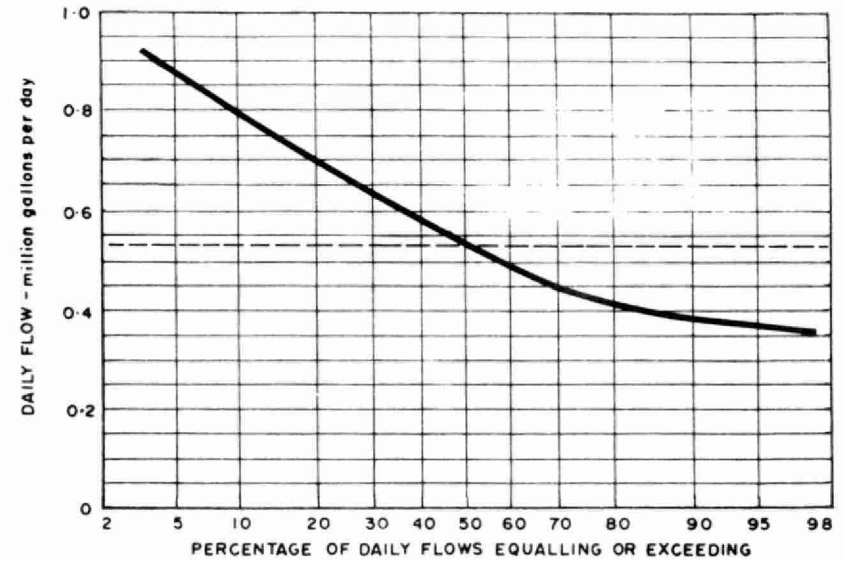
\* Estimated

## OPERATING EXPENDITURES

SALARIES AND WAGES	<u>\$9,937</u>
EMPLOYEE BENEFITS	<u>29</u>
TRANSPORTATION & COMMUNICATIONS	<u>923</u>
SERVICES	<u>327</u>
SUPPLIES AND EQUIPMENT	<u>7,286</u>
ACQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	<u>0</u>
TRANSFER PAYMENTS	<u>0</u>
OTHER TRANSACTIONS	<u>0</u>
TOTAL	<u>\$18,502</u>

# PROCESS DATA FLOWS

DESIGN CAPACITY 0.533 MGD



FLUORIDE  
(treated water)

## PLANT PERFORMANCE

MONTH	FLOWS				CHEMICALS USED		TREATED WATER					
	TOTAL PLANT OUTPUT million gallons	AVERAGE DAILY FLOW million gallons	MAXIMUM DAY'S FLOW million gallons	MAXIMUM RATE mgd	Na <sub>2</sub> SiF <sub>6</sub>		TURBIDITY		COLOUR		TEMPERATURE	
					AMOUNT USED pounds	DOSE mg/l	AVERAGE FTU	MAXIMUM FTU	AVERAGE App. units	MAXIMUM App. units	AVERAGE ° F	MAXIMUM ° F
JAN	17.2	0.55	0.60		219	0.8	1.3	1.8	10	10		
FEB	15.4	0.55	0.61		194	0.8	0.8	0.8	< 5	5		
MAR	18.8	0.61	0.69		214	0.7	2.6	4.0	10	10		
APR	18.5	0.62	0.77		206	0.7	1.2	1.4	10	15		
MAY	20.1	0.67	1.00		279	0.8	1.4	1.5	< 5	< 5		
JUNE	19.9	0.66	0.94		309	0.9	1.3	1.3	< 5	< 5		
JULY	26.0	0.84	1.40		343	0.9	1.3	1.5	< 5	< 5		
AUG	16.7	0.54	0.84		152	0.9	0.1	0.1	< 5	< 5		
SEPT	15.9	0.53	0.96		342	1.3	1.0	1.4	< 5	< 5		
OCT	13.0	0.42	0.46		286	1.3	1.6	2.6	< 5	< 5		
NOV	13.1	0.43	0.78		267	1.2	1.1	1.4	< 5	< 5		
DEC	13.1	0.42	0.50		249	1.1	1.0	1.2	< 5	< 5		
TOTAL	207.6				3060							
AVG.	17.3	0.57	MAXIMUM 1.40	MAXIMUM		0.9	1.3	MAXIMUM 4.0	< 6	MAXIMUM 15		MAXIMUM

## WATER QUALITY

PROPERTY	RAW WATER				TREATED WATER				DESIRABLE STANDARDS
	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	
HARDNESS in mg/l as $\text{CaCO}_3$	24	30	40	10	25	33	40	29	80 - 100
ALKALINITY in mg/l as $\text{CaCO}_3$	24	18	23	4	25	16	20	1	30 - 100
IRON in mg/l Fe	24	0.10	0.20	0.05	25	0.14	0.30	0.05	Less than 0.3
CHLORIDE in mg/l $\text{Cl}^-$	24	5	7	1	25	7	31	5	Less than 250
pH in pH units	24	7.4	8.0	5.7	25	7.1	7.9	6.7	7.0 - 8.5
FLUORIDE in mg/l $\text{F}^-$	20	0.2	1.0	<0.1	111	0.8	1.2	0.4	0.8 - 1.2

## CHLORINATION and DISINFECTION

MONTH	RAW WATER					PLANT EFFLUENT		DISTRIBUTION SYSTEM		CHLORINATION			
	NUMBER OF SAMPLES HAVING TOTAL COLIFORM ORGANISMS PER 100 ml OF					NUMBER OF SAMPLES TAKEN	NUMPER HAVING COLIFORM ORGANISMS	NUMBER OF SAMPLES TAKEN	NUMBER HAVING COLIFORM ORGANISMS	TOTAL AMOUNT OF CHLORINE USED pounds	DOSAGE		RESIDUAL IN PLANT EFFLUENT mg/l
	0	1 - 3	4 - 32	33-320	> 320						PRE - mg/l	POST - mg/l	
JAN	1	0	1	0	0	2	0	10	1	214	1.2		
FEB	0	0	1	0	1	4	0	13	0	188	1.2		0.5
MAR	2	0	0	0	0	2	0	9	0	208	1.1		0.5
APR	1	0	2	0	0	4	0	17	0	199	1.1		0.5
MAY	1	0	0	0	0	1	0	6	0	260	1.3		0.6
JUNE	1	0	0	0	1	2	0	10	0	307	1.5		0.8
JULY	3	0	0	1	1	3	0	18	0	433	1.7		0.9
AUG	1	0	0	0	2	4	0	15	0	339	2.0		0.8
SEPT	0	0	0	1	1	3	0	11	0	433	2.7		0.9
OCT	1	0	0	1	1	4	0	17	1	284	2.2		0.8
NOV	0	0	1	1	0	4	0	14	0	291	2.2		0.9
DEC	0	0	1	0	0	1	0	8	0	253	1.9		0.7
TOTAL	11	0	6	4	7	34	0	248	2	3409			
AVG.	18									9			
	(NOTE - Average shown is the GEOMETRIC MEAN)									pounds per day	1.6		0.7

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